***Exoskeletons***

**The Ability to Run Faster, Carry More Gear and Leap Tall Buildings**

**Skeleton Warriors**

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The United States wants its own starship troopers. As part of a project that's been quietly ticking away for months now, the Department of Defense has decided it needs to grant superhuman powers to its soldiers; providing them with the ability run faster, carry more gear and leap tall buildings. It plans to do this with powered combat Armour exoskeletons, and the first contract in the project was awarded this week.

Buried way down in a mundane Pentagon announcement of successful service tenders was an eight line statement revealing that a Californian company was being paid several million dollars to develop and test a strap-on propeller system, enabling individual warriors to fly.

Want to know more?

Bug hunt

In Robert Heinlen's classic book Starship Troopers, his protagonist is a serving member of Earth's Mobile Infantry. Standard equipment for these troops is the 'power suit', a combat-specific ensemble that enhances its wearer's physical abilities with hydraulics and servo motors, granting Herculean strength and the ability to jump hundreds of meters in a single bound.

To military planners, Heinlen's invention now seems like a pretty good idea. Scientists at the Defense Advanced Research Projects Agency (DARPA) have been looking at the concept as part of a project called "Exoskeletons for Human Performance Augmentation".

DARPA's stated objectives are "to develop devices and machines that will increase the speed, strength, and endurance of soldiers in combat environments....(leading) to self-powered, controllable, wearable exoskeletal devices and/or machines."

What the agency is looking for is equipment that will:

\* Extend the mission payload and/or range of the soldier.   
\* Increase the "lethality" and "survivability" of ground troops for short range and special operations.   
\* Enhance mobility and load carrying capacity to allow soldiers to carry more ballistic protection and heavy weaponry.   
\* Augment human strength.   
\* Increase human speed and endurance.   
\* Allow troops to "leap extraordinary heights and/or distances."

The undeclared point of all this enhancement is to turn even a single soldier into a super-potent angel of death. He will be able to employ heavy weapons systems that are currently impossible for a human to even carry, let alone fire from the hip. He will pack more ballistic protection and carry more ammunition and supplies. The Pentagon figures these improvements will be effective in all combat environments, but especially in urban terrain.

As with any powered system, the most critical issue facing combat exoskeletons is energy storage and actuation. Maximizing energy output versus bulk is the key equation, and power sources will have to be man-portable. Currently, researchers are exploring the use of highly-efficient chemical fuels for the mechanical actuation of the suits (as opposed to other energy storage media, like batteries or compressed air). At the current state of the art, this seems the best way to provide an exoskeleton with a "militarily significant" range and duration.

Super fly

The first private contractor to be awarded a noteworthy slice of the exoskeleton budget is Millennium Jet Incorporated, which is the commercial front of a syndicate trying to develop a one-man flying machine called the SoloTrek Exoskeletor Flying Vehicle (XFV). The gasoline-powered SoloTrek has featured in the futurist media for some time now, and it's developers claim that when finished, it should be capable of hovering for 3 hours and travel laterally at speeds of up to 130 km/h. The strap-on helicopter has been displayed at various engineering, aviation and military exhibitions but is yet to make a flight, prompting cynics to put it in the same basket as flying rocket cars and teleportation.

Millennium Jet aren't listening to the doubters though. Under the contract, the Department of Defense has given the company $5 million and three years to complete development and testing of the SoloTrek. Wind tunnel trials are currently underway at NASA's Ames Research Center, one of the development partners.

Since sustained flight is the most difficult objective to achieve, SoloTrek will be a benchmark for exoskeleton proponents .If it can indeed get off the ground, the idea of non-flying power suits will appear well within grasp. Certainly it would seem that existing levels of bio-mechanics, force feedback and control processing are sufficient to begin the march of the Robo-warrior.

And the birth of the Mobile Infantry...